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ABSTRACT

Although many elementary classrooms have computers, students commonly report that they do not know how to use the them. This study assessed the effectiveness of a computer training program for students to increase their awareness of and comfort level on Macintosh and IBM computers in their classroom. Participating were fifth graders in an academically heterogeneous class in a school serving a middle to upper class population. Eight students (four boys and four girls, representing a wide range of abilities) were selected by the teacher to complete the training program and then tutor the remaining members of the class involved in the study. The tutors trained classmates on the use of ClarisWorks, a word processing program, with four tutors working on Macintosh and four on IBM computers. Tutors completed a Training Checklist after working with each student. The students' skills were evaluated both before and after the training sessions; the results showed that over 87 percent of the student felt extremely comfortable on both computer systems after being trained and rated the training program as very good or excellent. (Seven tables and 11 figures delineate findings. Six appendices contain the computer assignments, training checklists, and questionnaires. Contains 36 references.) (KB)

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Improving the Effectiveness of Computers in the Elementary Classroom Through Peer Tutoring

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Abstract

Although many classrooms in America have computers, teachers and students commonly report that they do not know how to use the computers. In the present study, the researchers designed a computer training program for students to increase the students' awareness of and comfort level on the computer. The study involved a fifth grade class of 18 students. The researchers trained 8 students and those students used a peer tutoring model to train the members of the class who were involved in the study. After evaluating the students' skills both before and after the training sessions, the results showed that over 87 percent of the students felt extremely comfortable on the computer after being trained.

Improving the Effectiveness of Computers in the Classroom

In the past decade, our nation has witnessed a technological revolution and growth that has already enhanced the business world, and has the potential to greatly influence education. An example of technology in education is the presence of computers in most classrooms and schools across the country. However, the fact that these computers are not being used to their fullest potential remains a growing concern for educators and parents alike. Moreover, before the computers can even be integrated into the classroom in a more effective way, both teachers and students need to know how to use the technology. In a report by the Advisory Board on Teacher Education and Licensure (ABTEL) (1996), they commented that "serious inequalities exist in the ability of schools to provide instruction to enable students to use technology for effective problem solving and productivity" (p.1). Although there are some training programs and books for teachers to improve their technology skills, minimal training programs exist for students. Because of this technological revolution, schools need to teach their students how to use technology. Even if some students arrive at school already possessing computer skills, they should have the opportunity to extend their knowledge and learn more.

In addition to the students' inability to operate a computer effectively, a teacher's lack of knowledge about how to use the computer contributes to the notion that computers are not being used to their fullest potential in the classroom. ABTEL further comments that the "inequalities" they spoke of can be traced to a "lack of access to adequate equipment and the lack of training for teachers" (p.1). Today's teachers are expected to know everything there is about the computer systems provided for their classrooms, even without being properly trained on the systems. Responsibility to teach the students technology lies with the regular classroom teacher. Mark Steinberger (1997), director of technology for Port Washington NY school district, reports, "teachers no longer can just teach from the text, they're expected to be creators of curriculum to work with mixed ability groups, and to utilize a mass of new resources" (p. 37). However, studies show that there is a broad disparity between how much teachers should know and how

much they actually know. For example, Winnans and Brown (1992) found that only 21 percent of the teachers in their study considered themselves expert users of the computer systems in their classrooms. In another study, less than 30 percent of teachers in Albemarle County, Virginia considered themselves expert users (Fisher, 1997). The small number of teachers who feel comfortable training students on the computers in their classrooms leaves many students without help.

In addition to a lack of knowledge, time is another factor that prevents teachers from training students on technology. Because today's classrooms are so busy and time is limited, teachers do not have the opportunity to train students adequately and effectively on the computer. Consequently, they have to divide their regular instruction time with technology time, and so the end result is that technology continues to play a very small role in classroom life and is not used to its fullest potential. Therefore, a program that shifts the focus away from the teacher and toward the students teaching one another technology is needed, in order to allow teachers the freedom to teach regular instruction.

In this study, owing to the need to improve computer use in the classroom, we implemented a training program for students through which they received instruction for both the basic operations of a computer and a word processing program. Since word processing was the most widely used application in this particular classroom, learning the word processing program provided a meaningful and helpful application for the computer in the classroom. In order to save the classroom teacher time during her regular instruction, we used a peer tutoring program as the tool to train students on the computers. We trained eight students on the basics of a computer and the on the word processing program, ClarisWorks. Those students, in turn, trained their classmates. Through this program, the classroom teacher served as a facilitator and monitor (Greenwood, Delquadri, & Hall, 1989), instead of a full time technology teacher. It is our hypothesis that this program will result in the students demonstrating more control over their learning, an increase in their awareness of and comfort with technology, and an improvement in

their overall computer skills and typing assignments. We designed this study to encourage increased use of computers in the classroom setting. .

Background

Computers in the Classroom

Computers have been part of education for over 25 years. As early as 1969 there was a call for national computer literacy. "Nixon, recognizing the importance of computers to national security and economy, charged the National Science Foundation (NSF) in 1969 with developing a plan for national computer literacy" (Hughes, 1996, p. 4). During the span of 1978 through 1982 computer integration and literacy was still only a grassroots movement. In the mid-1980s America spent a great deal of money on computers (Vockell & Schwartz, 1988). In 1980 more than 60 percent of U.S. school districts had some sort of microcomputer. In 1981 "school districts spent more than $98 million to purchase of 35, 000 microcomputers for classroom use" (Becker and Sterling, 1987) . Getting computers into the classrooms started to become more of a national interest. Rand Corporation (1996) reports, "in 1983 there was about one computer for each 125 students in the nation's public schools." By 1988 there was one computer for every 30 students (Hathaway, 1989) and researchers believed a leveling off of expenditure would occur. Roberts, Carter, Friel, and Miller (1988) report, "trends during the next few years will show a leveling off of expenditures for computers, less community pressure for student computer literacy, and less concern about teacher computer literacy." The predicted leveling off of expenditure did not occur. In fact, the number of computers in the classroom rose dramatically over the next 6 years. In 1994, the nation's schools spent about $3 billion on computer- and network-based technology. As recently as 1995, there was a computer for each nine students. The optimal number of students at a computer is lower than nine, however, and the Clinton Administration cited that, "only 4 percent of schools have a computer for every five students-a

ratio that allows regular use by each student" as recently as February of this year (Clinton, 1997). Thus increasing the number of computers in classrooms is still very much a national concern.

Today's society is in the middle of what has been termed the Information Age. With this new age comes the rapid expansion and implementation of technology, especially the computer. The Department of Education defines technology as: "the World Wide Web, computer-aided design, word processing, data processing, electronic transfers" in their report, "Getting America's Students Ready for the 21st Century" (DOE, 1996) . With this change comes the natural reform of the education world. Tomorrow's students are expected to be technologically literate. The Department of Education report goes on to define technological literacy as: "computer skills and the ability to use computers and other technology to improve learning, productivity, and performance" (DOE, 1996). It concludes that technology "has become as fundamental to a person's ability to navigate through society as traditional skills like reading, writing, and arithmetic" (DOE, 1996). Information Age technology is changing the landscape of American culture (Mehlinger, 1996). Mehlinger (1996) stated, "The exact shape of America's schools is unclear." One thing is certain, "schools will be unable to resist the new technology" (p. 402). Thus far Mehlinger's prediction has been fulfilled.

Within the field of education in particular, computers are appearing in more and more district budgets and, more importantly, in greater numbers of classrooms across the country. In fact, many schools are pushing forward in accordance with President Clinton's 1996 Technology Literacy Challenge to "ensure technological literacy for all children" (Dwyer, 1996, p. 25). "The expectation is that by the year 2000, there will be a three-student-to-one computer ratio in our schools". On February 15, 1996, Clinton and Vice President Gore announced the Challenge to the nation. According to the national Secretary of Education, "the challenge was placed before the nation as a whole, with responsibility for its accomplishments shared by local communities, states, private sector, educators, parents, the federal government and others" (DOE, 1996).

The Technology Literacy Challenge is funded by Congress and includes a Challenge Fund that houses $200 million for grants which make funds available to the states. The states

then allocate the funds to localities (Electronic Learning, 1996, p. 8). The Technology Literacy Challenge also contains four concrete goals that define it. The goals address some of the problems many teachers and students face today when dealing with technology in the classroom. For example, goal one focuses on teacher training and support, while goal two discusses access to modern multimedia equipment. Goal three touches on the issue of connecting all schools to the Internet. Lastly, goal four focuses on the integration of software and on-line learning into "every school's curriculum" (DOE, 1996).

At the state level Virginia is also pushing for technological literacy for its schools. The state developed a Six-Year Plan (1996) for the integration of technology in classrooms. The plan emphasizes the need to teacher training, computer access, and other school needs that include wiring and communications problems now facing Virginia's schools. In 1995 the state also called on the Advisory Board on Teacher Education and Licensure (ABTEL) to "examine the issue of technology proficiencies as a requirement for licensure of instructional personnel" (ABTEL, 1996). The ABTEL recommendations are not yet operational, however, they are in state legislature at this moment. If passed, teachers would have to meet requirements for technology standards such as:

1. Operate a computer system and utilize software.
2. Apply knowledge of terms associated with educational computing and technology.
3. Use educational technologies for data collection, information management, problem-solving decisions making, communications, and presentations within the curriculum.
4. Plan and implement lessons and strategies that integrate technology to meet the diverse needs of learners in a variety of educational settings.

(ABTEL, 1996, p. 6)

Teachers would have to master requirements for these kind of standards before receiving state licensure. The Virginia State Department of Education (1995) has also included technology

standards for the first time in the State's Standards of Learning. The technology standards are now marked at the end of a students fifth and eighth grade years. By the end of fifth grade students are expected to know the following things about technology:

1.The student will develop basic technology skills.

- Develop a basic technology vocabulary that includes cursor, software, memory, disk drive, hard drive, and CD-ROM.
- Select and use technology appropriate to tasks.
- Develop basic keyboarding skills.
- Operate peripheral devices.
- Apply technologies to strategies for problem solving and critical thinking.

2. The student will communicate through application software.

- Create a 1-2 page document using word processing skills, writing process steps, and publishing programs.
- Use simple computer graphics and integrate graphics into word-processed documents.

(VA Board of Education, 1995)

The recent push for computer literacy for the nation and the state dictates that computer systems currently available in the classroom be more widely used. Problems arise, however, when the people who are supposed to use these systems do not have the skills necessary to operate them

The Need for Training

The continual addition of computers to the classroom dictates that teachers know how to use them. Many teachers, however, do not have sufficient skills to use the computers in their classrooms effectively. Becker (1989) reports that approximately 81 percent of teachers surveyed listed "knowledge of computers was weak" as a serious problem affecting their schools' ability to use computers effectively. Teachers cited this reason more often than lack of time to use the computers or not having access to a sufficient number of computers (Becker, 1989). Clinton's State of the Union Address (1997) reports, "about half of all teachers have little or no experience

at all with technology in the classroom." Hoffman (1997) adds, "many teachers are not motivated to take technology seriously" because they see time as a barrier against learning all the new technology. Teachers look around and see some of their colleagues continuing to teach quite nicely without a computer and ask themselves why they need to use computers in their classrooms (Hoffman, 1997). Teacher confidence plays a part in the use of computers in the classroom. Loveless (1995) reports, "confidence is often the key to competence, and we can adapt to new resources much more easily if we have the confidence that we know what we would like to do with those resources" (p. 12). Many teachers, however, do not have the confidence they need to work with computers effectively. Winnans and Brown (1992) found that teachers often feel that they do not have the skills necessary to use computers in the classroom. Of the 151 fourth and fifth grade teachers they surveyed, 82 percent reported they had taken part in some kind of in-service training program. However, of that percentage only 21percent rated their level of expertise as above average or high, while close to 75 percent rated their expertise as average or below average (Winnans and Brown, 1992, p. 304). This research shows, that even with professional development training programs, many teachers feel they do not have the skills necessary to train students. Hoffman (1997) states, "teachers may not feel comfortable using a computer themselves, and even less teaching students to use one, let alone teaching their curriculum with computers. They rarely have the dozens, sometimes hundreds of hours it takes to become really comfortable with digital technology" (p. 52).

The question remains: What can we do to change the situation? Hawkins (1996) reports, "education is the only 'knowledge industry' still asking the question of whether modern technologies should be part of the enterprise of learning and work" (p. 1). It is estimated that 60 percent of jobs by the year 2000 will require skills with information technologies (Hawkins, 1996). Teachers have accepted that technology will continue to be part of their jobs well into the 21st-century. How can teachers take advantage of this new technology and use it to enhance the learning of their students? One aspect of successful technology integration in schools is implementing more training. Simply put, teachers and students need training to feel comfortable

on the computer systems they encounter if there is to be any clear and successful use of them. In-service training programs for teachers are growing with each passing year. However, teachers still face barriers such as limited access to machines, insufficient support and lack of time when situated in their classrooms. Lack of time often becomes the true deterrent for teachers who do not feel they can sit down with each student individually and train him/her on the computers in the classroom.

Students who are not well trained on the computers often ask questions of the teacher. This continual barrage of questions takes even more time away from regular instruction. Teachers feel they have less time to respond to questions on both regular instruction and computer related problems. The literature suggests that students ask very direct questions about the machines in their classrooms. Shaw, Swigger, and Herndon (1989) found eight kinds of questions students ask when working on the computer:

> (1) Operating System- questions related to how to instruct the computer to load and execute a program and to create graphics and sound.
>
> (2) Keyboard- questions related to locating and using the appropriate keys.
>
> (3) Wait Time- questions related to computer response time.
>
> (4) Data Entry - questions concerned with how the computer accepts and processes inputs (data).
>
> (5) Program Instruction- questions related to the content of a specific program (e.g. subject matter questions, correct and incorrect responses)
>
> (6) Program Instructions-questions concerned with the program's instructions.
>
> (7) Screen Design-questions related to the meaning of figures or characters.
>
> (8) Miscellaneous-all questions which were not asked frequently enough to warrant a separate category. (p. 16)

A training program that focuses on these question areas would ensure that the students walk away with enough information to use any computer system without needing to call on the teacher

for assistance. At this time, a program that addresses these problem areas is not widely used in the classroom.

Why Use Computers in the Classroom?

The development of a training program which addresses the specific student questions, as described above, has the potential to increase technology use in the classroom. Improved training programs raise questions as to the validity of using computers in the classrooms. Some opponents to the infusion of technology insist that computers do not clearly increase learning opportunities. Research suggests otherwise. Peck and Dorricott (1994) describe a list of ten reasons for using technology in the classroom. They include the following reasons for integrating technology:

1. Students learn and develop at different rates. Technology can individualize instruction.

2. Graduates must be proficient at accessing, evaluating, and communicating information. Computers provoke students to raise searching questions, enter into debates, and engage in problem solving skills.

3. Technology can foster an increase in the quality and quantity of students thinking and writing.

4. Graduates must solve complex problems. Computer applications called productivity tools, such as databases, spreadsheets, and other programs allow students to independently organize information.

5. Technology can nurture artistic expression.

6. Graduates must be globally aware and able to use resources that exist outside the school. Technological tools allow students to inexpensively and instantly reach around the world.

7. Technology creates opportunities for students to meaningful work. Technology can provide a widespread audience for students.

8. All students need access to high-level and high-interest courses.

9. Student must feel comfortable with the tools of the Information Age. Computers are an increasingly important part of the world in which students live.

10. Schools must increase their productivity and efficiency. technology can re-place (not replace) the teacher and give him or her the freedom to do the important work that requires human interaction, continuous evaluation, and improvement of the learning environment. (Peck and Dorricott, 1994, p. 12-14)

Other literature suggests similar reasons for using 'technology' in the classroom. Computers can provide students with immediate feedback which is important at any grade level (Loveless, 1995). Hoffman (1997) reports that teachers perceive technology as, "expanding students' learning, experience capacities, and productivity; increasing interest in, applying, and reinforcing subject matter; and motivating learning through fun, relevance, reinforcement, and success" (p. 53). Computers also allow the teacher to develop units of instruction that go beyond the four walls of the classroom. Peck and Dorricott (1994) reiterate Vockell's (1988) findings that computers have the potential for providing access to other people and information around the world quickly and inexpensively. Kathy Douglas, a second and third-grade teacher at Central School in Bridgewater, MA constantly reaches beyond her classroom walls. (Mather, 1996, p. 32). She has taken her students to Antarctica, and is currently working with classes from Australia. Mary Mather (1996) adds, "the technology helps us bridge our basic curriculum objectives with meaningful, real-world connections" (p. 32). These real-world connections help students prepare for a future in information technology.

Research suggests that students and teachers who are trained to use computers in their classrooms take part in a new kind of learning environment. When fully integrated, computers can enhance everyday lessons by giving the students the opportunity for free exploration, team work, and problem solving situations, as well as other challenging situations. Hill, Liberman, York, Nichols, and Morgan (1988) report that, "students and teachers will work more as a team to derive and examine possible solutions rather than the teacher dominating all the instruction. Responsibility will be shared by both the teacher and students" in environments with integrated

computers (p. 48). Students have more control over their own learning and teachers work more as mentors and less as presenters of information (Mehlinger, 1996). If technology is integrated properly in schools, teachers could become "facilitators of learning and students could engage far more individualized and customized education" (Hathaway, 1989, p. 24).

Before complete integration of computers can exist in a classroom students and teachers need to be given the skills they need to operate in that kind of learning environment. Loveless (1995) states, "the children will need a degree of initial support in selecting appropriate resources for [classroom] tasks, learning the techniques to use a particular application, and knowing how to save, print out, and retrieve their work" before they can use computers in an integrated environment. Students need to have the skills to use the technology before they can successfully use it as an integral part of their school day. Teachers need to empower students to use the technology before the technology can empower the students to learn.

The future of technology in schools has yet to be determined. One thing is certain, however, computers will play an integral part in that future. Today's students need to have the knowledge and understanding of technology that will enable them to take part in the Information Age. A program that takes the focus off teacher involvement and gives students the freedom to explore their world without resignation is important for the success of technology in the classroom. As stated, empowering students to learn the technology will allow them to use it more effectively. Peer-oriented training programs give the students an opportunity to empower one another. Vockell and Schwartz (1988) suggest using peer tutoring situations with computers. They state, "one obvious way to use the computer with peer tutoring is simply to let the knowledgeable peer sit next to the student who is running the computer program and provide supplementary tutoring and feedback as necessary" (p. 59-60). Peer oriented programs also give students the freedom they need to succeed and allow the teacher to spend more time with regular instruction. Peer tutoring and training transforms the classroom into an arena in which learning time is increased and class size is decreased, where the teacher plays more of a facilitator role by

assisting groups of students, and where students take control of their learning and teach one another.

Peer Tutoring

The teaching strategy of peer tutoring and training is being practiced in classrooms nationwide for a variety of reasons and activities. It is used for group and individual work, reading, math, computers, art, physical education, and even clerical training (Zsiray & Peterson, 1990). Although there are many teaching strategies that are useful and effective, peer tutoring is unique in that it benefits both the tutor and trainee throughout the learning process. Both participants learn cooperation and responsibility, and participants receive more individual attention through working one on one or in small groups. There are many types of peer tutoring and training programs that have been created to fit a specific classroom, situation, or student. "Peer tutoring was adopted as a successful teaching and learning strategy in the United States in the 1960s and has been successfully used since" (Atherley, 1989, p. 145). Teachers are increasingly incorporating peer tutoring into their classrooms owing to the many positive outcomes that have been found. However, a training program needs to be carefully designed and set up so as to achieve a program's goals and to be successful.

Eggers (1995) lists five key aspects of a strong peer tutoring program: class preparation, tutor selection, tutor preparation, monitoring by teacher, and continuous assessment of students' progress. As part of her training program, Eggers (1995) teaches the phrase "pause, prompt, and praise" (p. 217) to all of her students so that when they each act as tutors, they know the elements of a strong tutoring program. Eggers believes in considering all students, even low achieving students, for the role of tutor. A solid training program should enable and encourage any student to become a tutor. Another important aspect of tutoring that Eggers mentions is that tutors need to provide their tutee with immediate feedback on their progress. In this way, both the tutor and tutee are aware of the tutee's progress.

However, before students can begin training other students, teachers must first take the responsibility of training, modeling, and monitoring the students who wish to be tutors. As McMahon & Goatley (1995) have stated, "Teacher modeling, scaffolding, and monitoring are important in helping students to move toward assuming more responsibility for the direction and content of the conversation" (p. 31). Once students have observed the appropriate way to tutor, from watching their teacher model the behavior, they will be able to model for and monitor the tutee.

Fuchs, Fuchs, Bentz, Phillips, & Hamlett (1994) also discuss a very important aspect of peer training: clear explanations and help. They comment that there "is a positive relationship between giving elaborated help and achievement" (p. 76). When a student tutor is able to explain a subject or topic explicitly, the tutee benefits in his or her academic studies. Interaction and communication between a tutor and tutee is very important. Vygotsky (1978) believes that learning results from interactions among learners. Furthermore, he thinks that learners accomplished more from and with others than alone. Many of the most successful tutors or trainers guide tutoring sessions through interactional, explanatory prompts, and questions, instead of immediately giving the answers to the tutees (Fuchs et al., 1994). The goal of any tutor should be to involve the tutee in direct learning activities and tasks.

Overall, the idea of peer tutoring and training helps the classroom teacher in significant ways, which in turn, positively affects the student tutor. When teachers create peer tutoring teams within the classroom, increased learning time and decreased teacher/student ratios occur. McMahon & Goatley (1995) talk about how teachers, on average, have about 25 students in their class, which limits students' opportunities to speak and participate in discussions. However, when peer tutoring is active, the classroom is full of small groups and partners and each student is receiving more individualized attention, even if it is from a peer. McMahon & Goatley show that students enjoy learning from their peers, and, in some instances, they learn better and understand more. Atherley (1989) states that "not only do children learn from their peers, but

they learn more from teaching their peers" (p. 152). Atherley also finds that children prefer to be tutored by peers.

Students save the teacher a large amount of time by performing some teacher duties and instruction through peer tutoring. In this way, the classroom teacher is free to supervise and monitor students during tutoring sessions, and need not be as concerned with teaching the technology lesson, since he or she is not directly teaching (Greenwood, Delquadri, & Hall, 1989). In addition, Greenwood et al. discuss how students spend less time with their hands raised waiting for teacher assistance, since their questions are presumably being answered by the peer tutors or small group settings. Peer tutoring is an excellent way to help students monitor their own behavior, act as authority figures (instead of the teacher), and take control of their learning. Concerning the process of allowing students to grow as peer tutors, Atherley (1989) comments, "Teachers must consider, however, that their own effectiveness may be increased when they encourage democracy in the classroom by allowing children to share the responsibility for tutoring" (p. 152). Peer tutoring and training transforms the classroom into an arena in which learning time is increased and class size is decreased, where the teacher plays more of a facilitator role by assisting groups of students, and where students take control of their learning and teach one another.

As mentioned previously, peer tutoring not only provides positive experiences for the classroom teacher, but the students who act as tutors are greatly affected in positive ways, which lead to very successful outcomes. Since increasing achievement and gaining skills are an important focus when students attend school, researchers study how peer training improves learning, literacy, and other skills. In one public elementary school in the Northeastern United States, teachers use peer tutoring in working with students in an urban setting to increase student achievement for low-income, low-achieving students (Fantuzzo, Davis, & Ginsburg, 1995). After implementing a peer tutoring program, Fantuzzo et al. did see an increase in student achievement in mathematics. Peer tutoring improves reading and math skills, provides opportunities for students to practice verbal and written skills, and increases and maintains high

levels of academic performance for all students (Kamps, Barbetta, Leonard, & Delquadri, 1994). Kamps et al. also observe that peer training was "easily adaptable to the regular classroom schedule" (p. 50). While there are many factors that contribute to students' successes at school, peer tutoring encourages the students to achieve high levels of mastery of the basic skills while offering the students and the teacher flexibility to use the tutoring throughout the whole school day.

Social as well as academic benefits accumulate from peer tutoring programs (Atherley, 1989). Students of all ages perceive themselves as competent participants in their class after they have served in a peer tutoring capacity. Because peer training requires students to interact with one another, it is a great avenue for helping students improve social skills and peer relations (Kamps et al., 1994). Inherent in learning social skills is gaining peer acceptance. Peer tutoring provides ample opportunities for increasing social acceptance (Garcia-Vazquez & Ehly, 1992). When a student who is not socially accepted takes on a higher status role, such as a peer tutor, he or she feels empowered and has more confidence in front of peers. Zsiray & Peterson (1990) say that "peer tutors are recognized by the elementary students as teacher aides and by students as important classroom helpers" (p. 7). In this way, students who are not readily looked upon as class leaders, or students who have a more difficult time with social interactions, have a means through which they can participate in class, be a leader and resource for others, have increased confidence, and be well respected by their peers. Keane (1992) finds that after several tutoring and training sessions, students improve in social skills and answering questions skills. If a teacher is concerned about establishing respect and cooperation in his or her classroom, peer tutoring and training may be a program that he or she should implement. Atherley (1989) believes that peer tutoring leads to a "more supportive social climate in the classroom with children working in a generally more stimulating, co-operative, and appreciative environment" (p. 152). Once again, because students are learning from one another, and because the situation naturally requires that they interact with one another to learn a skill or activity, an improvement in social skills, concern for others, and overall peer relations is most likely to occur.

One last domain in which peer tutoring and training are effective and influential is in the area of students' attitudes and outlook towards school. An instance of this includes a program in which fourth and fifth grade boys, who were known as trouble makers, acted as tutors for kindergarten students. By the end of the tutoring program, the boys' attitudes towards school and learning had significantly improved (Brake & Gerler, 1994). Brake and Gerler also comment on how tutoring others often leads the tutor to become more personally involved with learning, to accept responsibility, and to find more meaning in school. When the teacher places these students in authority positions and in charge of other persons' learning, the tutors become leaders and in the process of motivating the tutees, learn and gain a new perspective on school. Keane (1992) finds that a decrease in after-school detentions occur when students who were in detention were given the opportunity to tutor other students through the PAL (peer assisted learning) program. This particular program is based on the premise that students act out because they desire power. Peer tutoring provides the opportunity for students to have that power as they plan lessons for others. Keane concludes her study by saying that "an increase in attendance and improved classroom and school behavior may also be achieved if tutors are encouraged to feel a certain amount of control over the learning environment" (p. 13). Peer tutoring is effective in drawing students with behavior problems back into the regular school day and routine, while renewing the students' attitudes towards school and the entire learning process.

The present study combines the elements of peer tutoring, including student responsibility and leadership, social interaction, teacher monitoring, and increased learning time, in order to effectively train students on the computer. Peer tutoring provides a flexible avenue for students to increase their comfort level on the computer, and, in turn, further integrate computers into the classroom and their daily life.

Rationale

Our purpose in designing this project was to improve the effectiveness of the Macintosh and IBM computers in the classroom, using peer tutoring as our tool. With technology being such a growing phenomenon in this decade, integrating computers into the classroom and the

curriculum is an important task. Technology, when understood and properly used, can enhance a teacher's lessons, and make learning more individualized for the students. We chose to create a peer tutoring program because teachers already have many classroom responsibilities and duties, and often do not have the time to teach and train students on a computer. Peer tutoring not only helps the teacher save time with her teaching, but allows the students to take on a leadership role, cooperate with and help others, build social skills, improve their learning and attitude towards school, and take control of their learning. Implementing peer training on the computers not only enables the students to experience academic gains, but social gains as well. We believe that after each child in the class has been trained on the Macintosh and IBM computers, they will feel more comfortable working on computers. No longer will they fear turning on a computer, but instead, will perceive the technology as a tool that strengthens their work and offers them another way to present their work. They, in turn, will be able to independently write a paper or print out a document for class. Also, through this program, we hope to create a heightened awareness of the computers in the room, which will motivate students to want to use the computers, and in that way, increase the computers' effectiveness in the classroom.

Method

Students

The students in this study were members of a fifth grade academically heterogeneous class. The class was one of three fifth grade classrooms in Broadus Wood Elementary School, a rural, east coast school, consisting of a middle to upper class population. Although the school was located in the rural part of the county, it was still close enough to town that it was considered suburban. The class consisted of 18 white students, including 12 girls and 6 boys, ages 10-11. The class ranged in academic ability from remedial to gifted. For the peer tutoring aspect of the project, four boys and four girls, representing a wide range of abilities, both in the classroom and on the computer, were chosen by the teacher to act as the peer computer tutors and trainers.

Materials

The classroom in which the study took place contained two computers, a Macintosh and an IBM. The tutors trained the class using ClarisWorks software. ClarisWorks 3.0 was on the IBM computer, and ClarisWorks 4.0 was on the Macintosh computer. More specifically, the tutors trained the class on the word processing portion of ClarisWorks because it is the most widely used application on the computers at this time. The researchers chose this particular program of ClarisWorks since many students prefer to type, rather than write, their papers or writing assignments throughout the year.

An initial writing assignment (See Appendix A), which included specific tasks on each computer, was used to assess the students' abilities on the computer before the training program began. The writing assignment was part of their weekly writing journal, but for the purpose of this project, they were to type it on the computer. In addition to typing their paragraphs on the computer, students had to complete 14 activities as part of their initial writing assignment on the computer, such as turning the computer on and off, opening the word processing program, changing the alignment of text in the document, changing the font, style, and size of the text, saving the document, and finally, printing the document. There were places on the assignment sheet for the students to check off the tasks that they had performed. If a student could not carry out one of the activities, he or she did not put a check next to that certain task.

Another document that was introduced during the pre-training period of the project involved a computer questionnaire (See Appendix B), which each student answered after completing the Macintosh and IBM writing assignments (the students filled out a questionnaire for each computer system). This initial questionnaire contained statements concerning the students' level of comfort while performing the specific tasks on the computer. For each question, the students marked their answers on a 5 point Likert scale, which ranged from 1-5, with 1 representing "not comfortable" and 5 indicating "extremely comfortable." The final section of the questionnaire asked the students to generally comment on which task they found the most difficult and also to indicate to the researchers what they would like to learn on the computer. The third and fourth documents entitled "Training Checklist," found in Appendices C

and D, were completed by the eight trainers each time they trained a fellow classmate. The four trainers that worked on the Macintosh computer used the Macintosh checklist and the four trainers that work on the IBM used the IBM checklist. They used the training checklist as a guide for the tutoring sessions.

Every student, including the peer trainers, completed a post-training questionnaire located in Appendix E, which contained the same statements and scale ranges as the initial questionnaire that measured the students' levels of comfort when working on the computer. The students also completed follow-up writing assignments, which were less structured than the initial assignment. These assignments were a combination of text and graphics.

One of the last documents that the students had to complete was an overall evaluation of the peer training program (See Appendix F). At this time, students had the opportunity to share any successes, feelings, concerns, and/or recommendations about the program.

Throughout the project, the researchers provided a calendar for the students that informed them of when each student would be working on the IBM and Macintosh computer for the initial writing assignments (See Figure 1). In addition, the calendar was created and hung in the classroom to inform the trainers and trainees of who was being trained and when, so the students could refer to it when the researchers were not in the classroom. This further encouraged the students to take responsibility, since they had to cross off their names from the calendar upon completion of the training sessions. The calendar helped the researchers, teacher, and students remain organized and on task. The researchers also created an instruction sheet for the student trainers to use during training sessions with their classmates (See Figure 2). In addition, the researchers provided the students with folders, marked "IBM" and "Macintosh," in which they placed their completed assignments, questionnaires, checklists, and evaluations (See Figure 3). The folders were left in the classroom so the students could easily access them and leave work for the researchers to pick up. The folders and the calendars served as forms of communication between the researchers and the students, and reminders for the students of what assignments needed to be completed.

Program Implementation

The first step in the project was to determine who the eight peer trainers were going to be. The classroom teacher chose eight students from the class whom she believed would benefit most from serving as peer tutors. Once the eight students were chosen and informed of their role, the researchers proceeded to explain to the whole class why they were going to be working in their classroom, what the expectations of the project were, and what they would be doing for the next two months. The students were told that it did not matter how much previous computer knowledge or skill they had for this study. They were encouraged to at least try the initial assignment and give it their best effort. The students then began working on the initial computer activity sheets and questionnaires. Each student completed both of those documents for the IBM and Macintosh computers and stapled his or her writing assignment to them.

The students had two weeks within which to complete the initial assignment on both computers. After all of the students had finished the pre-training process, which included the initial assignment and questionnaire, the researchers began training the eight peer tutors. One researcher trained four students on the IBM computer, and one researcher trained four students on the Macintosh computer. During the training sessions, the students were shown the basics of operating a computer, and then, in greater detail, were shown how to use the ClarisWorks word processing software.

During the training sessions with the peer trainers, the researcher worked with one student trainer at a time, using the training checklist referenced earlier, to guide the training process. In order for the training sessions to be hands-on for the students, they were structured so that the student sat directly in front of the computer, and the researcher positioned herself next to the student. This way the student could easily maneuver the mouse and keyboard. The researcher began by introducing the hardware of the computer (the mouse, keyboard, monitor, and computer) and then led the students into exploring ClarisWorks word processing software.

As the researchers went through the training checklist, they not only showed the students where specific menu items were located, but how to use each menu item or word processing command. The students typed a small paragraph at the beginning of the training session and then applied and implemented the different word processing skills into their document throughout the training process. In this way, the students practiced what they learned and received immediate feedback from the researcher. The students were encouraged to ask questions at any point during the sessions. When they did ask questions, their questions were very specific. Questions were usually about a specific word processing skill and its purpose.

During these training sessions, if and when the peer trainers experienced situations in which they did not know how to solve a computer problem or question, the researcher instructed them on how to resolve the situation. Thus, when the peer tutors trained their classmates, they could help them in times of confusion, since they had encountered similar difficulties. Overall, the researchers concentrated more on teaching the trainers computer skills instead of tutoring skills.

The researchers created an instruction sheet for the trainers during the training sessions that included the steps necessary to complete one full training session. The instructions were placed next to the IBM and Macintosh folders and training materials.

Finally, a review session was held for both the IBM and Macintosh tutor groups. At that time, students could ask any questions they had before starting their training work. The peer trainers were given the post-training questionnaire after their training session with the researchers.

The peer tutors then began training their classmates. They used a calendar that the researchers provided to monitor their progress and know whom they were responsible for training next. The peer tutors conducted the training sessions in very similar ways to those of the researchers. They used the training checklist as a guide for training others and taught their classmates about the hardware of a computer and ClarisWorks word processing. During training sessions, the peer trainers also explained to the trainers where certain menu items were located

and for what purpose they were used. The peer trainers gave the trainees adequate time to practice each skill and ask questions. Although the researchers were available in the class during training sessions, the students conducted the training sessions on their own. During times of computer trouble, the trainers either asked one of the other trainers for help, or enlisted the help of one of the researchers. The researchers were present to answer any questions, clear any confusions, and monitor the students' progress.

Upon completion of the training sessions, the trainees filled out a follow-up questionnaire about their level of comfort on the computer. The peer trainers were responsible for ensuring that their trainee's assignment, questionnaire, and checklist were put into the IBM or Macintosh folders. The researchers distributed a final evaluation to the whole class that evaluated the peer training program's overall success. They explained the purpose of the evaluation, and thanked the class for participating.

Results

Results derived from the evaluations and questionnaires suggest that the peer training program was an overall success. As stated, we believe that after each child in the class has been trained on the Macintosh and IBM computers, they will feel more comfortable working on computers. Overall the students who participated in the program now feel extremely comfortable using the word processing application within the ClarisWorks software. Of the 18 students who participated in the program 16 of them said they "strongly agree" with the statement, "since I have been trained I feel more comfortable working on the computer" (See Table 1). The final evaluation results (See Table 2) display an overall satisfaction with the program. Approximately 16 of the 18 students who participated gave the program a "very good" or "excellent" rating. Table 2 results also suggest that students will use the computers much more in the future. Further results suggest success in reaching our goal to help the students independently write or print out a

paper. Seventeen of the 18 students in the class "strongly agreed" that they would not have to ask the teacher for help while working on the computer (See Table 1).

In concern to student comfort levels on the two computer systems available in the classroom, the results suggest an improvement. Tables 3 and 4 display the low comfort levels of many students before training took place. Saving work to the desktop proved to be the area of low comfort for approximately 22 percent of the students on the IBM computer (See Figure 4) and 22 percent of the students on the Macintosh computer (See Figure 5). In contrast, Tables 5 and 6 display a sizable increase in comfort levels for many of the students. In particular, no students (0 percent) felt at all uncomfortable saving work to either computer desktop after training. In fact, approximately 93 percent of the students felt above average or higher when saving to the IBM (See Figure 6). Figure 7 shows approximately 95 percent of the students felt above average or higher comfort levels when saving to the Macintosh.

In general, the students' comfort levels on both systems markedly increased after the implementation of the training program. Initial comfort levels for both computer systems ranged from lowest to highest, however, approximately 14 percent of students felt below average when using the IBM (See Figure 8) and approximately 12 percent felt below average when using the Macintosh (See Figure 9). Post training results show an improvement in comfort levels for students on both computer systems. After training only 1 percent of students trained felt their comfort levels were below average for either system. In contrast, 97 percent of the students felt above average or higher when working on the IBM (See Figure 10). Furthermore, Figure 11 illustrates 96 percent of the students felt above average or higher when working on the Macintosh.

Results from Table 7 suggest areas of improvement for future training programs. Approximately 17 students felt the researchers were "very helpful." Sixteen students also felt that the "Macintosh" and "IBM" folders were "very helpful" (See Figure 3). All 18 students felt that the calendar (See Figure 1) was at least "somewhat helpful."

The overall results of the peer training program suggest that programs such these have the potential to increase computer use in the classroom and encourage further study.

Discussion

The results support our anticipated goal that the students would feel more comfortable working on computers after they had been trained on the IBM and Macintosh computers. Over 87% of the students felt extremely comfortable on both computer systems after being trained. Specifically, in areas such as opening ClarisWorks and saving work, the students' comfort levels greatly improved after training.

Upon completion of the training program and further review of the final evaluations, the researchers realized that a couple of outside factors influenced the students' comfort levels on the computer. First, about half of the students had either an IBM or Macintosh computer in their home. We believe this contributed to the students' high ratings of comfort on the computer, indicated by their ratings on the follow-up questionnaires and final evaluations. These students had prior knowledge of and experience with computer systems, and therefore already felt comfortable with technology. The present training program enhanced their previous knowledge.

Another factor that contributed to the high comfort level ratings on the computers included the trainers' role in the classroom. Several of the trainers said they felt more comfortable on their respective computer system because they had to teach the skills related to that specific computer system. The role of peer trainer enabled the students to review and practice their computer skills not only through their training with the researchers, but through their opportunities to teach others.

Moreover, according to the results of the final evaluation of the peer training program, all students increased their awareness of computers and thought they would want to use computers more often in the future, owing to the effectiveness of the computer peer training program. Although many of the students did not perceive themselves as using the computers for other

subjects in school, our results demonstrated an interest by the students to learn other computer programs. Possibly, once the students received training and learned other programs, they would have a better understanding of how to integrate the computer into all of their subjects.

Throughout the study, the students demonstrated elements of a successful peer tutoring program. The students had the opportunity to experience increased learning time since they were working in small groups or one-on-one for the computer training process. Instead of waiting for the teacher to answer a question (Greenwood, Delquadri, & Hall, 1989) about the computer, the students asked and relied upon the peer tutors for directions and clarity in times of confusion. Moreover, after training, a majority of the students felt as though they would not have to ask the teacher for help as often as they used to. In one instance, a peer tutor from the IBM team recognized that neither the teacher nor another IBM team member were available for help, and so he sought the help of a Macintosh team member, who assisted him promptly. Although those two trainers were on the separate computer teams, they still considered each other valuable resources for the computer training and worked together to solve problems.

Our students, as demonstrated on the final evaluation, considered the presence of the researchers or adults in the room during training sessions as very helpful and comforting. If a situation arose that the students could not solve, they knew they could have it solved by the researchers or teacher. Since most students still perceive teachers and other adults as more knowledgeable, they trust them for answers. The researchers also benefited from being in the room during the peer trainer and trainee training sessions, because they had the opportunity to observe tutoring strategies by the students, students' reactions to the tutors, and the overall progress (including strengths and weaknesses) of the training program.

As Shaw, Swigger, & Herndon (1995) commented, students tend to ask very specific questions when working on the computer. Interestingly, the students in our study followed that pattern. While working with the peer trainers, the tutees asked questions relating to the hardware, keyboard, and word processing program. "Asking fellow students specific questions and receiving responses related positively to students' learning computer-programming

commands and to their ability to interpret programs" (Fuchs, Fuchs, Bentz, Phillips, & Hamlett, 1994). We believe that since the students were given the opportunity to ask questions in a one-on-one situation, they took advantage of that experience and tried to learn all that they could. Peer tutors were excellent resources for questions, since they had been trained by the researchers on the same material as the tutees. Also, because both the trainer and tutee were students, a common line of thinking, relating, and problem solving was shared in regard to the computers and the training. For example, in the final evaluations for the training program, when the students were asked to comment on if they liked being taught by their peers, one student answered, "Yes, because they are kids and sometimes your friend and they understand you better." It was comforting to many students to be trained by their peers. This idea supports Atherley's (1995) belief that children prefer to be tutored by their peers.

Social gains also accrued owing to the peer tutoring program. The peer trainers were constantly communicating with their classmates and receiving exposure to social situations. The peer tutors not only had to teach their classmates, but interact on a personal and relational level as well. The peer tutoring strategy enabled students who had never been placed in small groups together the opportunity to work in small groups or one-on-one with each other.

Recommendations

Although the program was successful in increasing the effectiveness of computers in the classroom and improving the students' comfort levels and skills on the computer, it had its limitations and shortcomings. In the following discussion, we mention the limitations of our study, with our recommendations for how to improve upon similar situations. We received many of these recommendations from our students, which leads into our first recommendation: listen to students' input and comments during evaluation time. Since they are experiencing the training and technology first hand, they know how they feel, react, and learn. They will help to shape and improve future technology endeavors throughout the year.

Second, our class size only consisted of 18 students. This study would be very interesting to implement with a larger group, such as an entire grade level or over several grade levels. Moreover, the demographics of the class influenced this study. Since the students came from middle to upper class families and neighborhoods, a majority of the students had computers in their homes, and therefore had previous knowledge and experience about computers. Results may have differed if this study had been given to a different socioeconomic class of students who had never encountered technology, except in the school, and even those times may have been minimal. We recommend examining the students' previous knowledge with computers before implementing a training program. In this way, a teacher may be able to predict the students' attitudes, competencies, and comfort levels on the computer.

Time was another factor that we considered a limitation in the study. We recommend allocating plenty of time for a program such as this one. One way to do this is to start a peer tutoring computer training program in September, or sometime near the beginning of the school year. Since we allowed only three months for the students to complete an initial assignment, receive training, and complete two evaluations on the project, there was not enough thorough training that took place. We only had time to train the 8 peer tutors once, and they in turn only had time to train their classmates once on an individual basis.

Although the students rated the overall training program as very good on the final evaluations, they thought the training they received could have been better. On many of the final evaluations for the training program, students said that if they could have changed anything about the program, both the trainers and trainees would "change the idea of training a trainee once." They also said they should have a review session. As in other subjects in school, computer learners need repetition and review in order to fully understand the technology. Other students thought the program could be improved by "allowing more time to train the peer tutors."

When the teacher does allow him or herself more time to train peer tutors, activities can be incorporated into the training sessions to strengthen the students' knowledge of and skill on the computer, and further prepare them for the peer trainer role. For example, teachers can create

or ask students hypothetical situations that may happen while training another, so a students can decide and learn how to solve computer and relational problems. After the training by the teacher is over, have the student trainers train the teacher. This way, the teacher can assess the strategies that the students will use to train others. Finally, evaluate the trainers on their skills of the computer at the end of the session to ensure they know all that they should. This may include giving another questionnaire, a mini computer quiz, or some other means of assessment. A review session or meeting may be necessary during the period when peer trainers are training their classmates. In the context of a class meeting, the students can report to the teacher any successes or troubles they are having and the teacher can monitor the students' and peer trainers' progress. If the peer tutors are not trained well, then a peer tutoring program will not be successful.

The teacher needs to teach effective tutoring skills, in addition to computer skills. This may include teaching students how to allow for wait time, offer praise, ask prompting questions, be more of a guide than a hands-on teacher (in other words, allow their fellow classmates to control the mouse and try for themselves), and give clear explanations and immediate feedback. Unfortunately, owing to time constraints, we did not teach effective tutoring skills. However, when students do incorporate effective tutoring skills, they enhance their tutoring sessions.

Another limitation of our study included the lack of technology. The classroom in this study only had two computers, one IBM and one Macintosh, and so between 18 students, they had to share two computers. More students may have been trained in a shorter amount of time had more equipment been available, such as a school computer lab.

Lastly, coordinating our schedules with the classroom teacher's schedule was a challenge. As we discussed in our introduction, classrooms are very busy places, and classroom schedules are prone to change by the minute. We were only able to go into the classroom on specific days of the week, which limited our training and observation time. Also, depending on the day, the students would have special assemblies, presentations, standardized testing, and other events that

they had to attend, which further affected our schedule and presence in the classroom. We encourage and recommend to future researchers to be flexible with classroom schedules.

Future Research

Since we developed this study as an exploratory pilot study that was to be implemented and then evaluated, we had the opportunity to consider recommendations for future research and implementation of a program that attempts to improve the effectiveness of computers in the elementary classroom. A result of our program implementation is a training manual that covers computer basics and word processing skills and is currently in process. The manual is designed for upper elementary students and teachers and could easily be used in future training programs that extend our scope. For example, one possible extension of this project and area in which to use the training manual includes having the students from one grade train students in the lower grades of a school. This not only would require using a larger class or group size, but would benefit more than one classroom and grade in a school. In addition, the older students would feel a sense of control over learning and teaching (Keane, 1992), since they would be teaching younger peers.

Another recommendation for research involves comparing the effectiveness of the two computer systems (IBM vs. Macintosh) in the elementary classroom. We only examined the effectiveness of computers in the elementary classroom in general, but a comparison study of the two types of computers would help give educators information on which system is used more often, on which system people feel the most comfortable, and which system is more effective for education.

This study could also be expanded by examining the way that peer tutoring is implemented in the classroom. We specifically chose computers as our focus with peer tutoring, but peer tutoring can be used for reading, math, art, physical education, and clerical duties. As Kamps (1994) says, "Peer tutoring [has] been successful in increasing and maintaining high

levels of academic performance for all students" (p. 50). Students have benefited from peer tutoring in a wide realm of environments.

Lastly, as a recommendation for increasing the effectiveness of computers in the classroom, we suggest and encourage all teachers to be trained effectively on computer systems. A study could be done to evaluate the integration of computers into the classroom with a teacher who was well trained on technology and a teacher who had not received adequate training on technology. The study could consider such factors as teacher and students' attitudes towards computers, comfort levels on the computers, and overall amount of use of the computers in the classroom.

Through a peer computer training program, the present study has enabled students to gain knowledge on both the IBM and Macintosh computer systems and helped students feel more comfortable with technology. In turn, this has encouraged students to integrate computers into their daily activities, such as typing papers and assignments. The training program proved effective in its efforts to improve awareness of technology and overall computer skills. As our study has proven, once students are given the opportunity to learn technology and gain skill in that area, they are more willing to use it and feel confident when working with it. Although our study did not specifically look at teacher training, we advocate for all teachers to learn technology, so when their students ask questions, they will be able to not only answer them, but encourage them to keep learning and exploring the many ways that computers can enhance classroom life.

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Table 1.

Final Evaluation for Future Computer Use

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= strongly disagree
3= neutral
5= strongly agree

Future Implications	Personal Rating 1=strongly disagree 3= neutral 5=strongly agree				
	1	2	3	4	5
Will Use the Computer More Often	0	1	2	8	7
Feels More Comfortable on Computer	0	1	1	6	10
Wants to Use Computer More Often	0	1	1	4	12
Wants to Learn Other Programs	0	0	2	4	12
Sees Computer Use in Other Subjects	0	1	6	3	8
Interested in Training Others	0	1	1	5	11
Doesn't Have to Ask Teacher for Help	0	0	1	8	9
Enjoys Being Trained by Classmate	0	1	2	5	10

Table 2.

Final Evaluation for Overall Training Program

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= poor
3= good
5= excellent

Program Aspects	Overall Rating 1= poor 3= good 5=excellent				
	1	2	3	4	5
Overall Program	0	0	2	5	11
Training Received	0	1	6	7	4

Table 3.

Students' Initial Computer Knowledge for the IBM Computer System

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= least comfortable
3=comfortable
5=extremely comfortable

Knowledge Area	**Comfort Level** 1= least comfortable 3= comfortable 5=extremely comfortable				
	1	**2**	**3**	**4**	**5**
Turning Computer On	2	4	2	0	10
Opening Clarisworks on Desktop	4	0	3	5	6
Opening Word Processing Doc.	2	1	2	5	8
Aligning Paragraph Left, right, center	2	0	2	5	9
Indenting Paragraphs	0	0	1	2	15
Using Different Fonts	1	0	2	1	14
Using Different Styles	0	1	1	2	14
Changing Size of Font	0	0	1	3	14
Correcting Mistakes/Editing Text	1	2	2	2	11
Using Spellcheck	4	1	2	2	9
Saving Work to Desktop	2	2	2	8	4
Printing Paragraph	1	0	1	3	13
Total	19	11	21	38	127

Table 4.

Students' Initial Computer Knowledge for the Mac Computer System

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= least comfortable
3=comfortable
5=extremely comfortable

Knowledge Area	Comfort Level 1= least comfortable		3= comfortable		5=extremely comfortable
	1	2	3	4	5
Turning Computer On	2	1	5	5	5
Opening Clarisworks on Desktop	2	2	3	7	4
Opening Word Processing Doc.	1	1	7	2	7
Aligning Paragraph Left, right, center	1	0	3	4	10
Indenting Paragraphs	0	0	2	1	15
Using Different Fonts	0	0	2	3	13
Using Different Styles	0	1	1	1	15
Changing Size of Font	0	0	2	3	13
Correcting Mistakes/Editing Text	2	1	1	5	9
Using Spellcheck	4	1	0	1	12
Saving Work to Desktop	3	1	3	5	6
Printing Paragraph	0	3	3	4	8
Total	15	11	32	41	117

Table 5.

Students' Post Training Computer Knowledge for the IBM Computer System

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= least comfortable
3=comfortable
5=extremely comfortable

Knowledge Area	Comfort Level 1= least comfortable 3= comfortable 5=extremely comfortable				
	1	2	3	4	5
Turning Computer On	0	0	2	1	15
Opening Clarisworks on Desktop	0	0	0	3	15
Opening Word Processing Doc.	0	0	0	1	17
Aligning Paragraph Left, right, center	1	0	0	3	14
Indenting Paragraphs	0	0	0	0	18
Using Different Fonts	0	0	0	0	18
Using Different Styles	0	0	0	0	18
Changing Size of Font	0	0	0	0	18
Correcting Mistakes/Editing Text	1	0	0	2	15
Using Spellcheck	0	0	1	1	16
Saving Work to Desktop	0	0	1	2	15
Printing Paragraph	0	0	0	2	16
Total	2	0	4	15	195

Table 6.

Students' Post Training Computer Knowledge for the Macintosh Computer System

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= least comfortable
3=comfortable
5=extremely comfortable

Knowledge Area	Comfort Level 1= least comfortable 3= comfortable 5=extremely comfortable				
	1	2	3	4	5
Turning Computer On	0	1	0	3	14
Opening Clarisworks on Desktop	0	0	2	3	13
Opening Word Processing Doc.	1	0	0	2	15
Aligning Paragraph Left, right, center	0	0	0	1	17
Indenting Paragraphs	0	0	0	0	18
Using Different Fonts	0	0	0	0	18
Using Different Styles	0	0	0	0	18
Changing Size of Font	0	0	0	0	18
Correcting Mistakes/Editing Text	0	0	0	6	12
Using Spellcheck	0	0	2	0	16
Saving Work to Desktop	0	0	1	3	14
Printing Paragraph	0	0	1	0	17
Total	1	1	6	18	190

Table 7.

Final Evaluation for Training Materials

The Following Information Comes from a Survey Distributed to 18 Fifth Grade Students
Students were asked to describe their comfort level on the computer.
The Scale for the Survey Ranges from 1-5.
1= not helpful
3= somewhat helpful
5= very helpful

Training Materials and Assistants	Degree of Helpfulness 1= not helpful 3= somewhat helpful 5=very helpful				
	1	2	3	4	5
Directions on the sheets	0	0	1	10	7
Miss Soden and Miss Sills	0	0	1	0	17
Calendar	0	0	4	4	10
Folders	0	0	2	0	16

Figure Captions

Figure 1. Photograph of the calendar provided by the researchers for student training program

Figure 2. Photograph of the instruction sheet provided by the researchers for student training program

Figure 3. Photograph of the Macintosh and IBM folders provided by the researchers for the student training program.

Figure 4. Students' initial comfort level saving to the desktop on the IBM computer system

Figure 5. Students' initial comfort level saving work to the desktop on the Macintosh computer system

Figure 6. Students' post-training comfort levels for saving work to the desktop on the IBM computer

Figure 7. Students' post-training comfort levels for saving work to desktop on Macintosh computer system

Figure 8. Students' initial comfort level for the IBM computer system

Figure 9. Students' initial comfort level for the Macintosh computer system

Figure 10. Students' post-training comfort levels for IBM computer system

Figure 11. Students' post-training comfort levels for Macintosh computer system

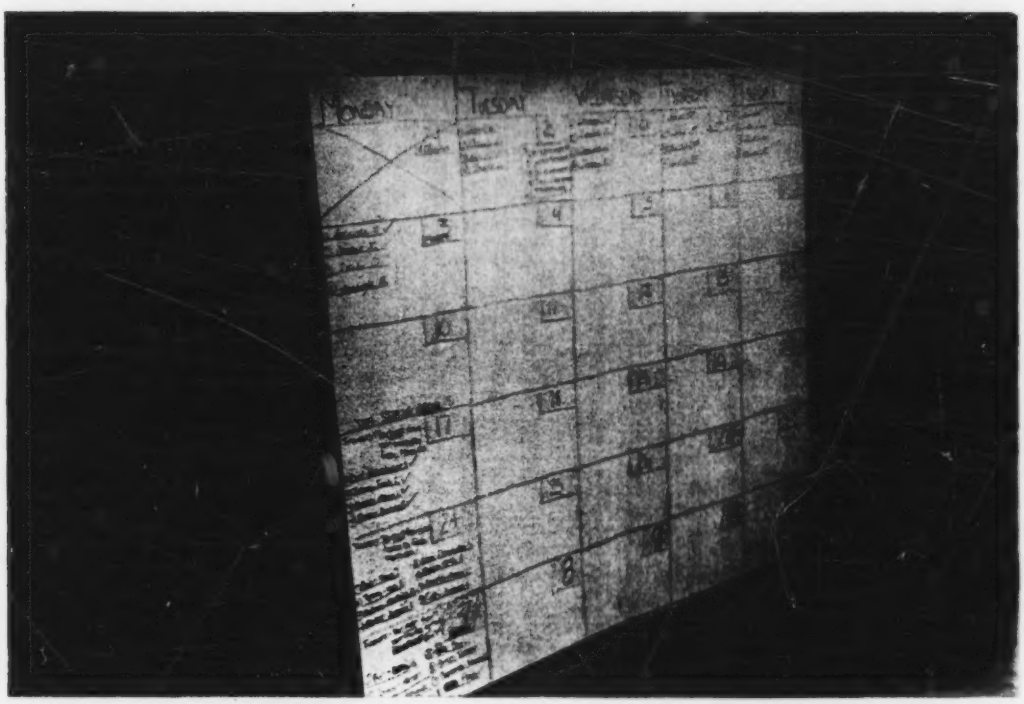

Figure 1.

BEST COPY AVAILABLE

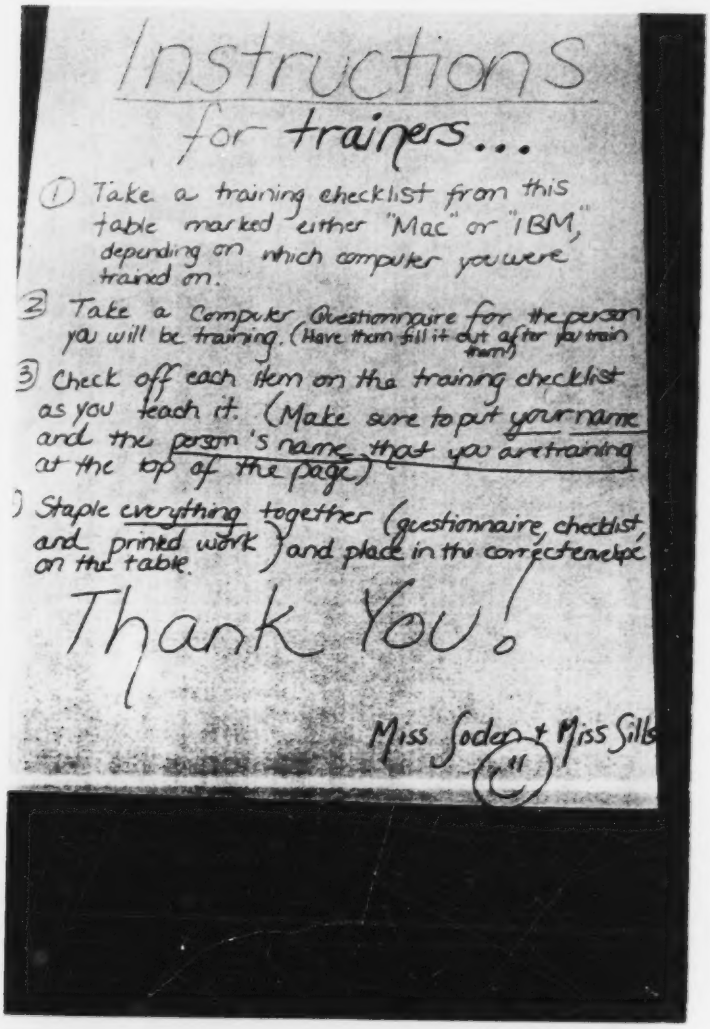
Instructions
for trainers...
1) Take a training checklist from this table marked either "Mac" or "IBM," depending on which computer you were trained on.
2) Take a Computer Questionnaire for the person you will be training. (Have them fill it out after you train them)
3) Check off each item on the training checklist as you teach it. (Make sure to put your name and the person's name that you are training at the top of the page)
) Staple everything together (questionnaire, checklist, and printed work) and place in the correct envelope on the table.
Thank You!
Miss Soden + Miss Sills

Figure 2.

BEST COPY AVAILABLE

Figure 3.

BEST COPY AVAILABLE

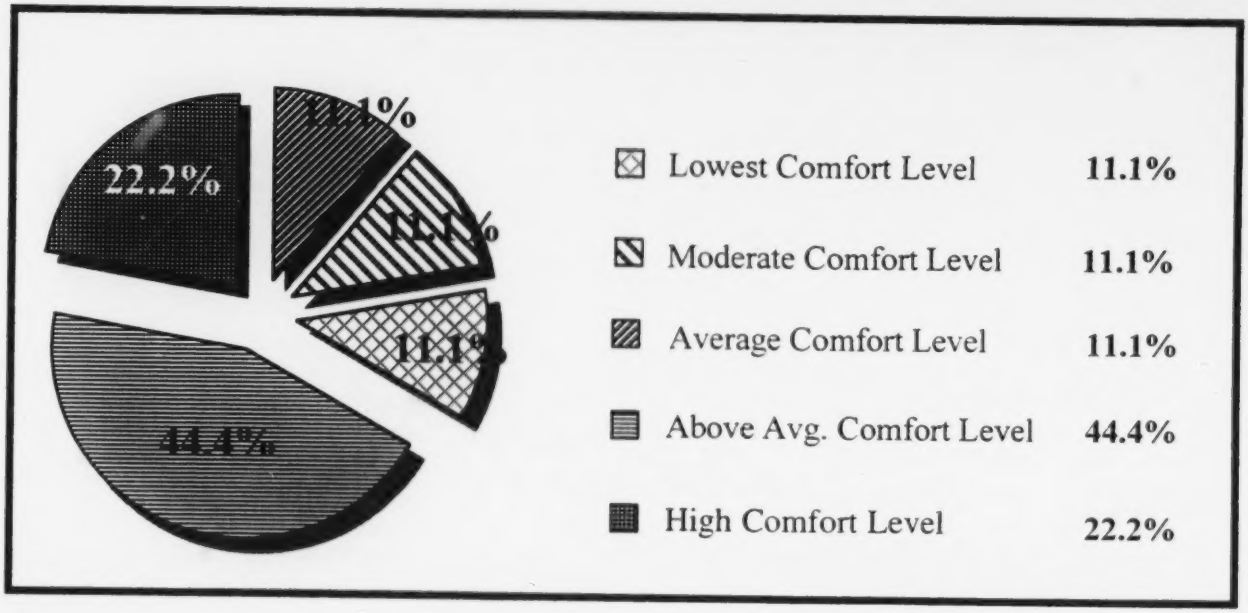

Figure 4.

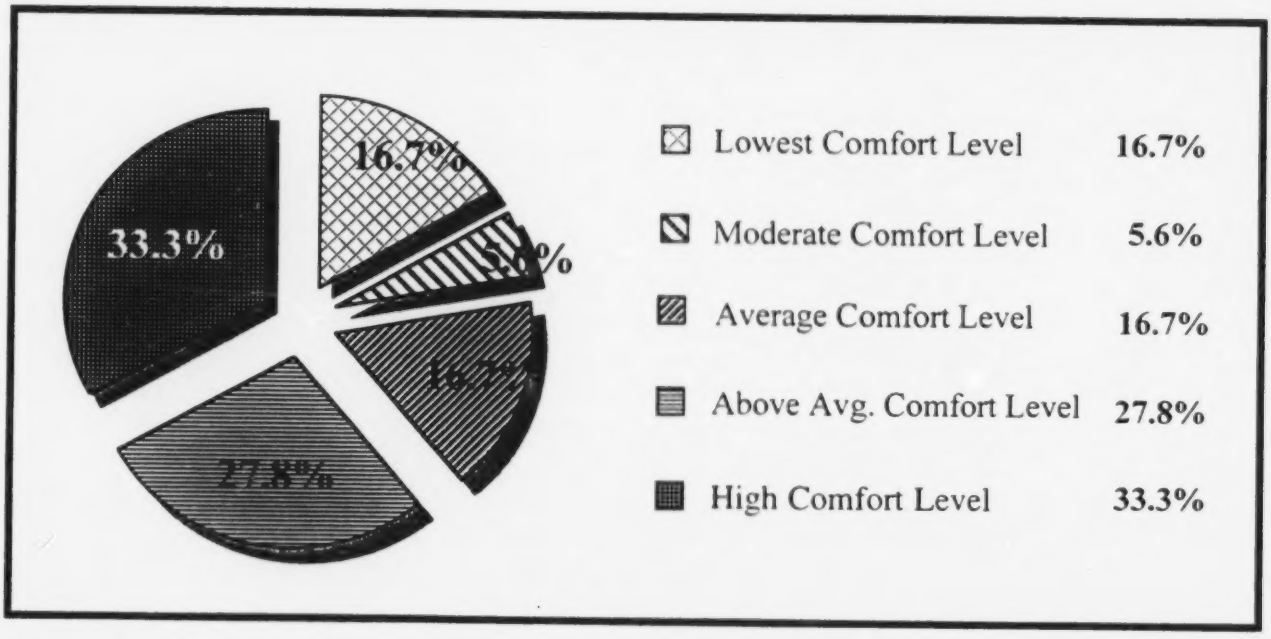

Figure 5.

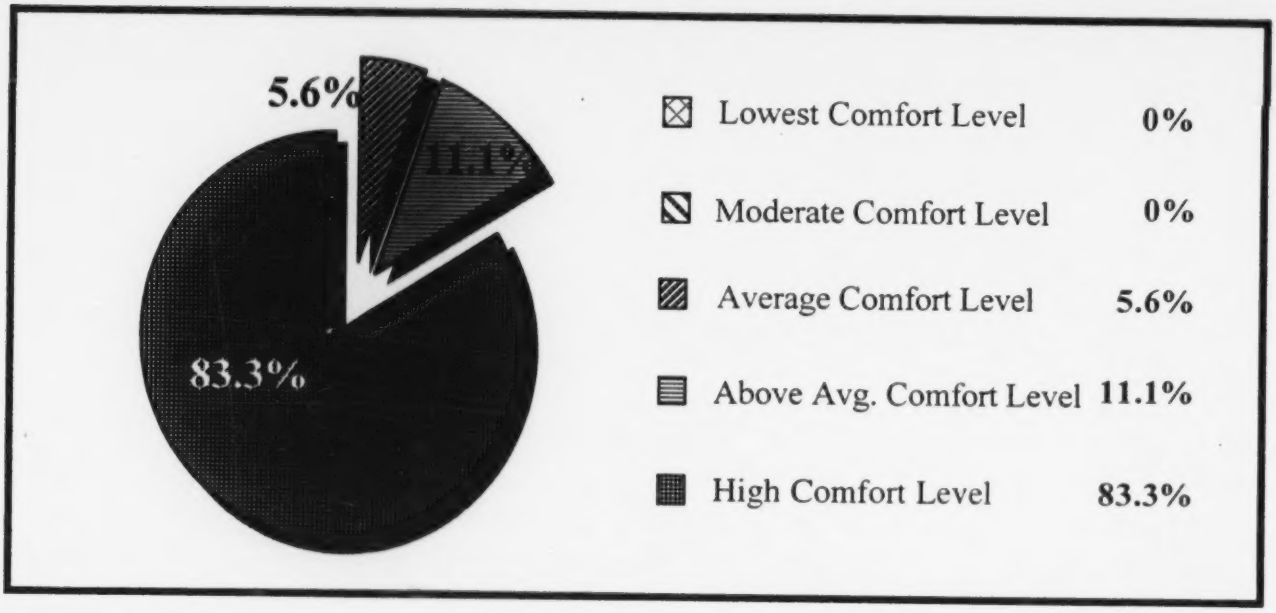

Figure 6.

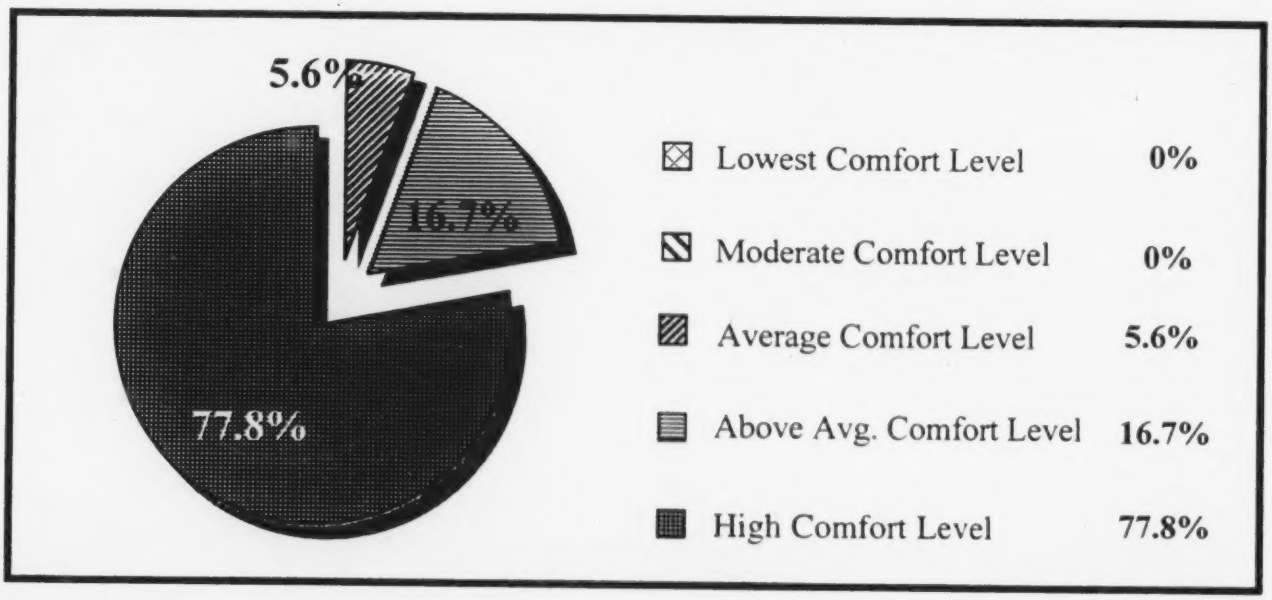

Figure 7.

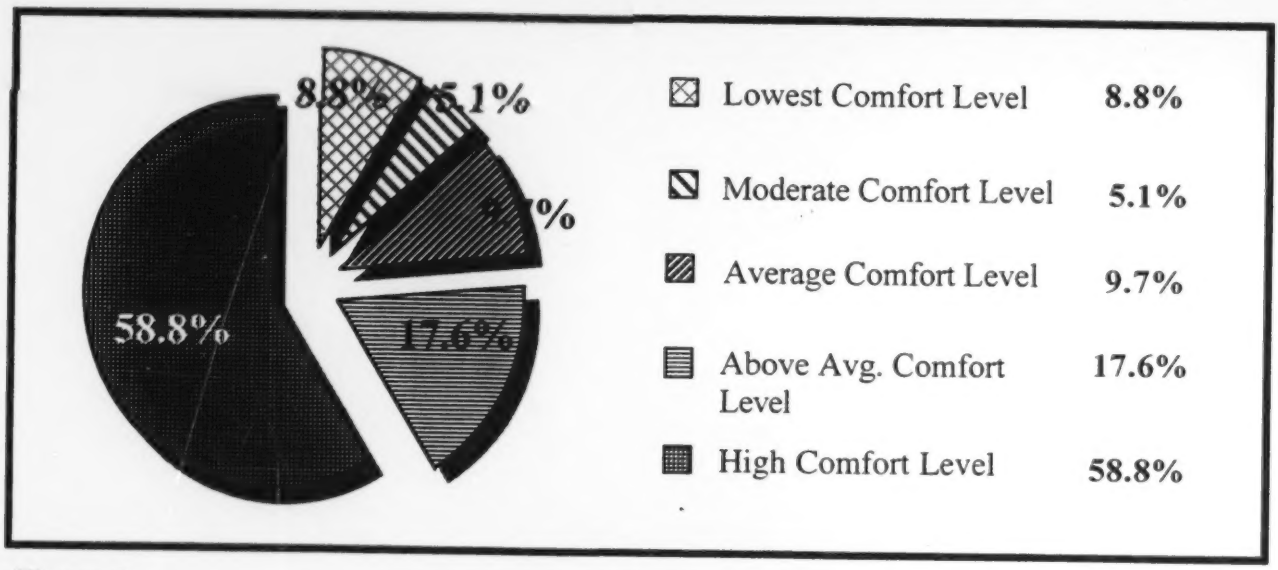

Figure 8.

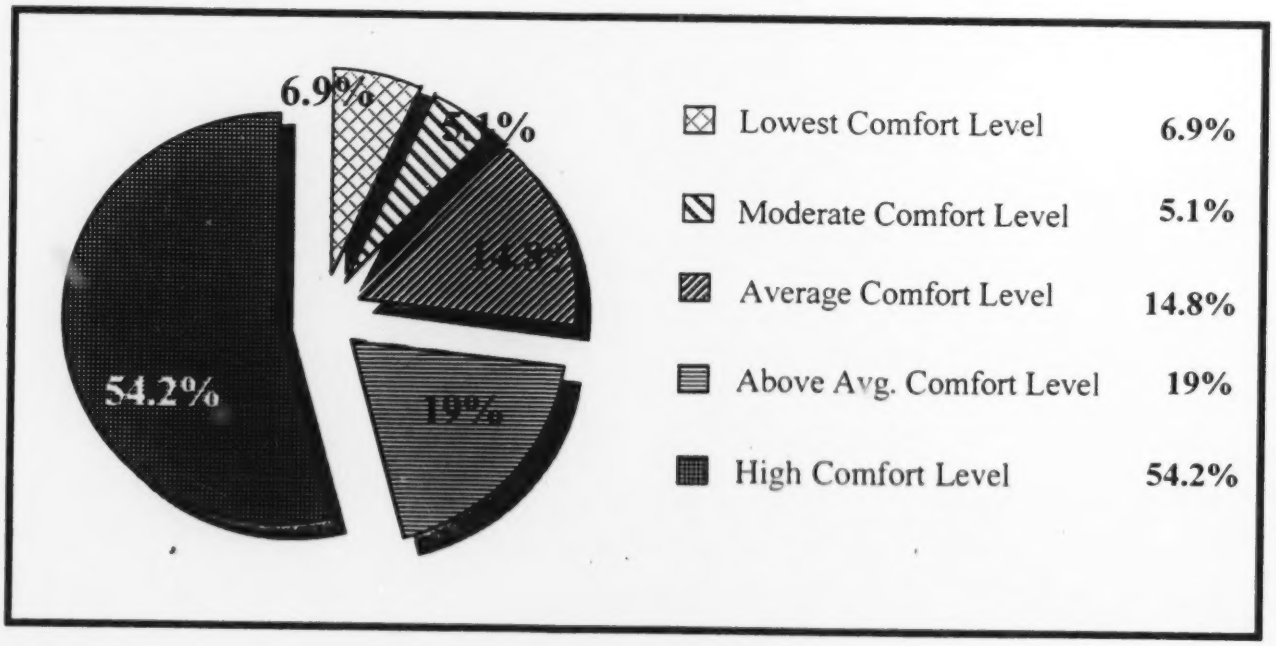

Figure 9.

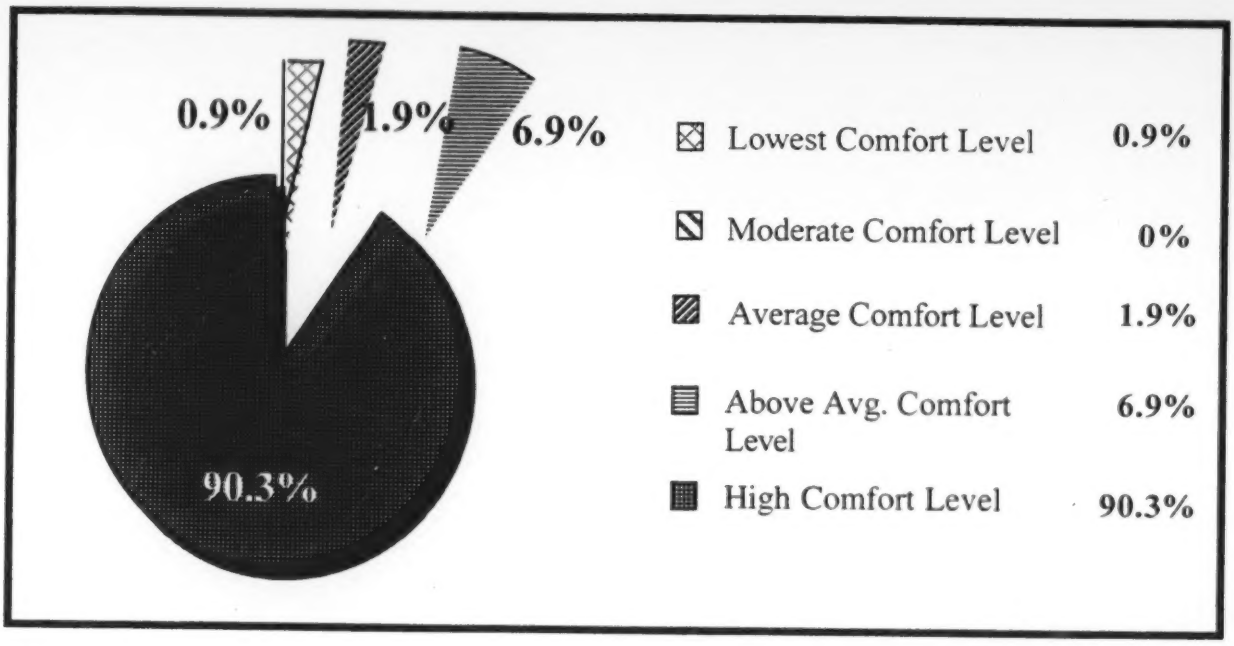

Figure 10.

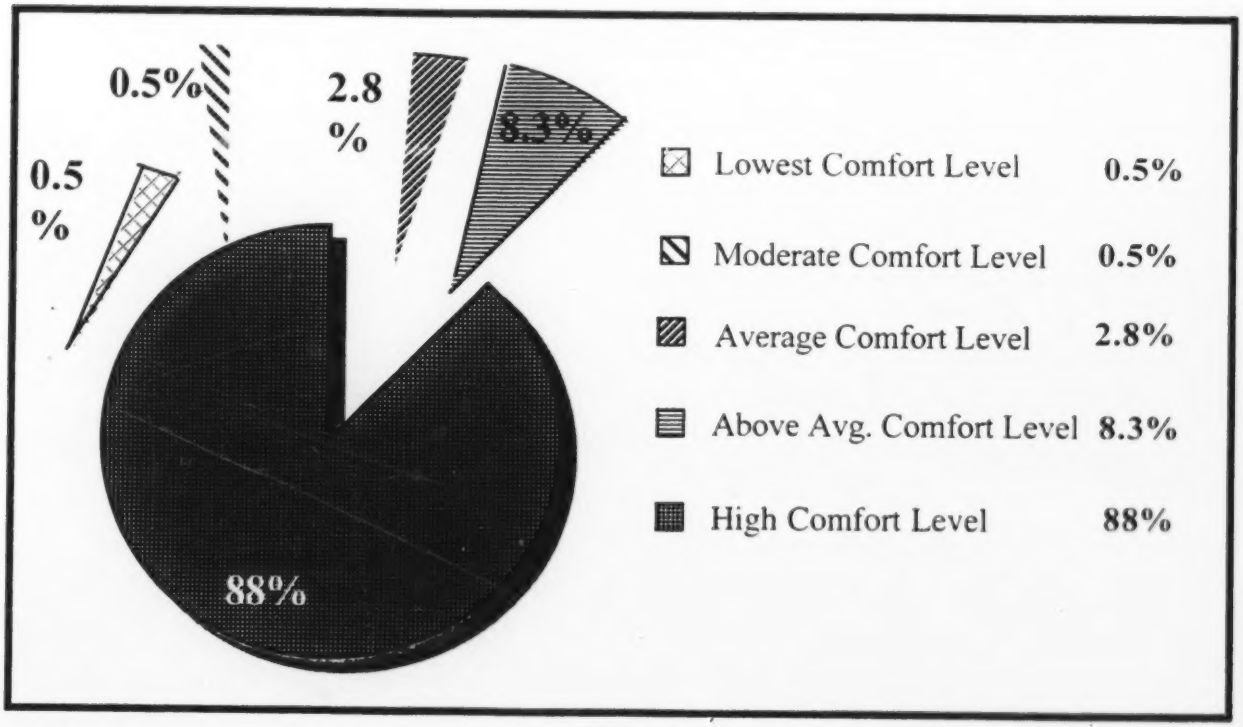

Figure 11.

Appendices

Appendix A: Initial Computer Assignment

Appendix B: Pre-Taining Computer Questionnaire

Appendix C: Training Checklist for the Macintosh Computer

Appendix D: Training Checklist for the IBM Computer

Appendix E: Post-Training Questionnaire

Appendix F: Final Evaluation for the Peer Training Program

Appendix A

Initial Computer Assignment

COMPUTER ASSIGNMENT

Name_____Date_____

Computer (IBM or Mac):_____

Directions:

--Please type up one of your Dialogue Journal paragraphs on the IBM computer, using ClarisWorks.

--Please type up another one of your Dialogue Journal paragraphs on the Macintosh computer, using Clarisworks.

--Please fill out a separate computer assignment sheet for each one of your paragraphs.

--Below is a checklist that contains items that you should include in your typed paragraph.

****However, if there is an item on this list that you do not know how to do, after giving it a try, move on to the next item. Please only put a check next to the items that you completed.**

Please do the following:

_____ 1. Turn the computer on to begin (the computer may already be on, so please just write here that it was already on _____).

_____ 2. Open Clarisworks on the desktop, and then choose and open the Word Processing program.

Can you do the following?:

_____ 3. Put your name and date in the upper right hand corner of the page.

_____ 4. Center the title "Dialogue Journal."

_____ 5. Align your paragraph to the left.

_____ 6. Indent your paragraph.

_____ 7. Underline the first sentence of your paragraph.

_____ 8. Change the font of the last sentence in the paragraph to "Chicago."

_____ 9. Increase one word in your paragraph to 14 pt. size lettering.

_____ 10. Did you know how to correct your mistakes when typing? What did you use to correct a mistake?_____

_____ 11. Spellcheck your work.

_____ 12. Save your work to the desktop.

_____ 13. Print your paragraph, staple it to this sheet, and place it in the envelope marked either IBM or Macintosh.

_____ 14. Great job!! You are done!! Give yourself a pat on the back.

Appendix B

Pre-Training Questionnaire

COMPUTER QUESTIONNAIRE

(Please fill this out after completing typing assignment)

Computer: _____

I. Background Information:

- Male _____ Female _____
- What computers have you used in the past?

  _____
- Do you have a computer at home? _____ If so, what kind is it?

  _____
- How many hours a week do you spend on the computer?_____
- Which computer system do you feel most comfortable using?_____

II. Application: (Circle the number that best describes your comfort level on the computer. 1=least comfortable; 3=comfortable; 5=extremely comfortable)

How comfortable are you with...

- **turning the computer on**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

- **opening Clarisworks on the desktop**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

- **choosing and opening the word processing program in Clarisworks**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

. **aligning the paragraph left, right, and center**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

. **indenting a paragraph**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

. **using different fonts in your writing**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

7. ____**using different styles (bold, underline) in your writing**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

8. **changing the size of your writing**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

9. **correcting mistakes or editing the text**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

10. **using spellcheck**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

11. **saving your work to the desktop**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

12. **printing your paragraph**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

III. General Comments: Please share any thoughts about the assignment and survey. Also, please tell us in more detail about the areas of the assignment that gave you trouble and why. **What would you like to learn about the IBM and Mac, that you don't already know?**

Appendix C

Training Checklist for the Macintosh Computer

Trainer:_____ Trainee:_____

Training Checklist for the Macintosh Computer

I. Parts of the Computer:

_____ explain how to turn the computer and monitor **on and off** (don't actually do this, but point to the buttons on the keyboard and monitor that would turn the computer on and off)

_____ point to the **mouse and mouse pad** and explain what is meant by a **single** and **double click**

II. Desktop:

_____ resize the window

_____ select/highlight a window

_____ move the window

_____ explain the apple menu

III. Clarisworks:

_____single click on **"File"**
***Explain the following menu items:**

_____ new

_____ open

_____ close

_____ save as

_____ print

_____ quit

_____single click on **"Edit"**
*** **Explain the following menu items:**

_____ **cut**

_____ **copy**

_____ **paste**

_____ **select all**

_____ **writing tools to "check document spelling"**

_____single click on **"Format"**
*****Explain the following menu items:**

_____ **document (how to set margins)**

_____ **paragraph (how to set line spacing)**

_____single click on **"Font"**
*****Try out some different fonts in your writing. Click on the font that you want to try.**

_____ single click on **"Size"**
*****Choose (click on) what size you would like your text to be.**

_____ single click on **"Style"**
*****Try out some different styles in your writing (bold, italic, underline). Click on the style that you want to use.**

_____ single click on **"View"**

_____ click on "**show tools"** and practice playing with the different drawing tools.

IV. Shortcut Menus:

_____ use the open apple key (for example, change the style this way by pressing the open apple key and "B" at the same time to make a highlighted word **bold**)

_____ use the pop-up shortcut menu

_____ use the shortcut menu above the writing document

V. Other items to check out:

_____ locate help balloons

_____ locate the "library" of pictures

*****PRINT OUT YOUR WORK AND STAPLE IT TO THIS CHECKLIST*****

Appendix D

Training Checklist for the IBM Computer

Trainer:_____ Trainee:_____

Training Checklist for the IBM Computer

I. Parts of the Computer:

_____ explain how to turn the computer and monitor **on and off** (don't actually do this, but point to the buttons on the computer tower and monitor that would turn the computer on and off). Point out the **disk drive** and how to **insert and eject a disk**.

_____ point to the **mouse and mouse pad** and explain what is meant by a **single click, double click**, and how we always use the **left button** on the mouse, not the right button

II. Desktop:

_____ resize the window

_____ select/highlight a window

_____ move the window

III. Clarisworks:

_____single click on **"File"**
*****Explain the following menu items:**

_____ **new**

_____ **open**

_____ **close**

_____ **save as—(make sure that correct directory, folder, and "drive" is selected)**

_____ **print**

_____ **exit**

_____single click on **"Edit"**

***** Explain the following menu items:**

_____ **cut**

_____ **copy**

_____ **paste**

_____ **select all**

_____ **writing tools to "check document spelling"**

_____single click on **"Format"**
*****Explain the following menu items:**

_____ **document (how to set margins)**

_____ **paragraph (how to set line spacing)**

_____single click on **"Font"**
*****Try out some different fonts in your writing. Click on the font that you want to try.**

_____ single click on **"Size"**
*****Choose (click on) what size you would like your text to be.**

_____ single click on **"Style"**
*****Try out some different styles in your writing (bold, italic, underline). Click on the style that you want to use.**

_____ single click on **"Outline"**
*****Choose "outline format" and practice making different lists.**

_____ single click on **"Window"**

_____ click on "**show tools**" and practice playing with the different drawing tools.

IV. Shortcut Menus:

_____ use the pop-up shortcut menu (go under "File" to "Shortcuts")

_____ use the shortcut menu (small icons) above the writing document

V. Other items to check out:

_____ locate the help menu

*****PRINT OUT YOUR WORK AND STAPLE IT TO THIS CHECKLIST*****

Appendix E

Post-Training Computer Questionaire

COMPUTER QUESTIONNAIRE

(Please fill this out after completing typing assignment)

Computer: _____

I. Application: (Circle the number that best describes your comfort level on the computer. 1=least comfortable; 3=comfortable; 5=extremely comfortable)

How comfortable are you with...

. **turning the computer on**

1 **2** **3** **4** **5**

not comfortable extremely comfortable

. **opening Clarisworks on the desktop**

1 **2** **3** **4** **5**

not comfortable extremely comfortable

. **choosing and opening the word processing program in Clarisworks**

1 **2** **3** **4** **5**

not comfortable extremely comfortable

. **aligning the paragraph left, right, and center**

1 **2** **3** **4** **5**

not comfortable extremely comfortable

. **indenting a paragraph**

1 **2** **3** **4** **5**

not comfortable extremely comfortable

. **using different fonts in your writing**

1 **2** **3** **4** **5**

not comfortable extremely comfortable

7. ____**using different styles (bold, underline) in your writing**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

8. **changing the size of your writing**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

9. **correcting mistakes or editing the text**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

10. **using spellcheck**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

11. **saving your work to the desktop**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

12. **printing your paragraph**

1 **2** **3** **4** **5**
not comfortable extremely comfortable

II. General Comments: Please share any thoughts about the assignment and survey. Also, please tell us in more detail about the areas of the assignment that gave you trouble and why. **What would you like to learn about the IBM and Mac, that you don't already know?**

Appendix F

Final Evaluation for the Peer Training Program

FINAL EVALUATION FOR THE PEER TRAINING PROGRAM

Name:_____

I. **Written Response Questions:**

2. How did the training program improve your computer skills?

3. Describe what you liked most about working with your classmates.

4. Describe what you liked least about working with your classmates.

5. What are the differences between being taught by a teacher and being taught by your classmates?

6. What can you use the computer for in the classroom, now that you have been trained?

6. On which computer system (IBM or Mac) do you feel the most comfortable? Why do you feel the most comfortable on that system? **(Please answer both questions).**

7. In what area(s) on the computer do you think you have improved the most?

8. In what area(s) on the computer do you think you have improved the least?

9. Please describe or list the questions that were difficult to understand or those questions that were not clear on the surveys and questionnaires. (Did you have trouble understanding the questions on the assignments, surveys, and questionnaires?)

II. **Rating the Training Program:**

****Please circle the number that best describes the way you felt about the computer training program.**

1. How helpful were the directions on each sheet (assignments and questionnaires)?

1 2 3 4 5
not helpful somewhat helpful very helpful

2. How helpful was it to have Miss Soden and Miss Sills in the classroom to answer your questions?

1 2 3 4 5
not helpful somewhat helpful very helpful

3. How helpful was the calendar (the one under the blackboard) that we made to remind you of who was trained during certain weeks?

1 2 3 4 5
not helpful somewhat helpful very helpful

4. How helpful were the folders that were marked "IBM" and "Mac"? (In other words, did it help to have somewhere to put your completed work?)

1 2 3 4 5
not helpful somewhat helpful very helpful

5. How would you rate the training program **overall**?

1	2	3	4	5
poor	**fair**	**good**	**very good**	**excellent**

6. How would you rate the computer training that you received?

1	2	3	4	5
poor	**fair**	**good**	**very good**	**excellent**

***For this next section, please circle whether you **strongly disagree, disagree, are neutral, agree, or strongly agree** with each statement.

1. I think I will use the computer more often.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

2. Since I have been trained, I feel more comfortable working on the computer.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

3. I want to use the computer more often.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

4. I want to learn other programs on the computer besides Clarisworks word processing.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

5. I think I can use the computer for all subjects in school, not just for typing papers.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

6. I would be interested in training other classes on the computer.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

7. I feel like I don't have to ask the teacher for help as much as I used to when working on the computer.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

8. I enjoyed being trained by a classmate instead of a teacher.

1	2	3	4	5
strongly disagree	**disagree**	**neutral**	**agree**	**strongly agree**

9. If you could change anything about the computer training program, what would you change and why?